DHF-TST-011



DHF Mission Readiness Test Support Plan

August 1997

Signature

U.S. Geological Survey / EROS Data Center
Sioux Falls, South Dakota

DHF Mission Readiness Test Support Plan

June 27, 1997

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Table of Contents

1.0 Introduction.

1.1 Purpose. This document is intended to explicitly state the roles and responsibilities of the EROS Data Center Data Handling Facility (EDC DHF) personnel in supporting the NASA/GSFC Landsat-7 mission readiness test program.

1.2 Scope. This document identifies the mission readiness tests that the EDC DHF will participate in, the procedures and test tools that the EDC DHF will be required to provide, and the test result reporting required of the EDC DHF staff.. EOSDIS Core System (ECS) is not part of the EDC DHF. ECS support required for Landsat 7 mission readiness test activities must be negotiated separately by the Mission Readiness Manager with the ECS developers.

1.3 Applicable Documents. The following documents are referenced herein:

1. Landsat-7 Ground System Integration and Test Plan, 510-2ITP/0395, January 1997

2.0 Background

2.1 Context. The Landsat 7 Mission Readiness Manager (NASA/GSFC) is responsible for verifying that the fielded Landsat 7 ground system is in compliance with the mission requirements stated in the Landsat 7 Detailed Mission Requirements (DMR). The Mission Readiness Manager has produced the Landsat 7 Ground System Integration and Test Plan (510-2ITP/0395) which outlines the test management structure and nine basic system level tests intended to verify DMR requirements. In addition to the testing outlined in the Landsat 7 Ground System Integration and Test Plan, the Ground System Manager has arranged for the NASA Compatibility Test Van to travel to EDC in order to verify the DHF RF compatibility with the Landsat 7 spacecraft and to serve as a stimulus platform for Landsat 7 ground system end-to-end tests.

For those mission readiness tests and CTV tests that involve ground system elements located at EDC, EDC DHF personnel will provide the operations staff and test engineering staff required to perform the tests and provide any project/engineering coordination required to successfully perform the tests.

By definition, all test support described herein is provided prior to launch of the Landsat-7 satellite. The time frame and specific sequence of testing is a function of ground system development status. Adjustments to the ground system development schedule will necessarily cause adjustments in the mission readiness test support schedule.

2.2 Mission Readiness Tests requiring EDC DHF support. The Landsat 7 Ground System Integration and Test Plan defines nine basic test cases. Some of these test cases are performed multiple times or contain significant subsections. EDC DHF will support the mission readiness tests listed in Table 1. Please note that the scheduled dates shown are accurate as of the publish date for this memo but will likely move somewhat as the ground system and spacecraft development proceed. Please refer questions regarding schedule to the Mission Readiness Manager. Refer to Appendix B of this document for a description of each of the tests listed in

Table 1.

Table 1. EDC DHF-related Mission Readiness Tests

Test Number	Test Name	Scheduled Start	Scheduled Finish
I&T 4.b	Mission Science Data Processing	10/15/97	10/16/97
I&T 4.c	Mission Science Data Processing	12/01/97	12/02/97
I&T 6	Mission Planning/Scheduling Tests	10/6/97	10/10/97
I&T 7.g	TT&C - Landsat Ground Station (LGS) Data Flow	11/20/97	11/24/97
I&T 9.a	TT&C - Fully Integrated Ground System Test	10/27/97	11/07/97
I&T 9.b	TT&C - Fully Integrated Ground System Test	1/06/98	1/19/98
I&T 9.c	TT&C - Fully Integrated Ground System Test	3/10/98	3/23/98

3.0 EDC DHF Roles and Responsibilities.

3.1 Systems Engineering. The EDC DHF will provide the systems engineering staff required to support Mission Readiness Test Team meetings, coordinate logistics and facility requirements for supporting mission readiness tests, and general project coordination between the Mission Readiness Manager and EDC.

3.2 Test Procedures. DHF personnel will write test procedures required to perform the DHF portions of the tests identified in Table 1. This includes writing procedures for the operation and test of the LGS, LPS, and IAS. The procedures will be written to verify the LGS, LPS, and IAS detailed mission requirements listed in the Landsat 7 Ground System Integration and Test Plan. These requirements are reprinted here in Appendix A. Also included in these procedures will be manipulations required to provide test stimulus and to configure the DHF for test. The test procedures will be coordinated with other Landsat elements involved in the test (Flight Operations Team, for example). The test procedures will be written by DHF test engineering staff and provided to the Mission Readiness Manager for review and approval no later than 30 calendar days prior to the scheduled start of the tests.

3.3 Test Data, Test and Analysis Tools. The Mission Readiness Manager is responsible for providing any test equipment, analysis tools, and test data sets required to perform the mission readiness tests.

3.4 Test Readiness Reviews. The EDC DHF test engineering staff will support any test readiness activities deemed necessary by the Mission Readiness Manager.

3.5 Test Execution. The EDC DHF will provide the staff required to configure test stimulus or other test tools required for performing the tests. DHF operations and test engineering staff will

perform the tests documented in the test procedures. In addition, the EDC DHF will assign a test engineer as the EDC DHF Test Conductor. The test conductor is the EDC DHF point of contact for all issues regarding the execution of the tests.

3.6 Test Results/Reporting/Analysis. The EDC DHF personnel will record test results in the test procedures. Where possible, hard copies of log files, screen dumps, etc. will be used to document test results. Any test results that deviate from the acceptance criteria documented in the test procedure will be reported to the Mission Readiness Manager or his designee. The Mission Readiness Manager or his designee is responsible for any test analysis required to determine if the requirements targeted for verification have been verified. The Mission Readiness Manager is responsible for all problem reporting, tracking, and resolution activities related to the mission readiness tests.

Appendix A.
DMR Requirements versus I&T Test Matrix

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
2000.06	LGS	The LGSf shall provide downlink services for Landsat 7 [see Sec 2700, 2720].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2000.06.01	LGS	The LGS shall provide S-band downlink services [see Section 2700, 2720].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2000.06.02	LGS	The LGS shall provide services for two X-band (wideband) downlinks [see Section 2700, 2720]				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2000.14	LGS	The LGS shall provide S-band uplink services [Ref 3, Sec 3.7.5.3.2] [see Sec 2700, and 2730].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2000.16	LGS	LGS shall provide range rate services for Landsat 7.				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.01	LGS	The LGSf shall receive X-band and S-band signals from the satellite as specified in section 2720 [Ref 3, Sec 3.7.5.1.1].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.03	LGS	The LGSf shall forward received wideband data to the LPSf in real-time [Ref 3, Sec 3.7.5.3.4].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.04	LGS	The LGSf shall introduce no more than one bit error in 10**9 bits forwarded wideband data [Ref 3, Sec 3.7.5.3.5].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.06	LGS	The LGSf shall detect and report equipment failures to the MOCf [Ref 3, Sec 3.7.5.2.5].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.07	LGS	The LGSf shall receive schedule information from the MOCf [Ref 3, Sec 3.7.5.1.2].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.09	LGS	The LGSf shall be capable of supporting integration and test prior to launch [Ref 3, 3.7.5.4.3].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
2700.11	LGS	The LGSf shall have an availability for data capture operations of .995 or better [Ref 3, Sec 3.7.5.3.6].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.13	LGS	The LGSf shall receive the orbital elements from the MOCf as specified in the MOC to LGS ICD [Ref 3, Sec 3.7.5.1.3].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.19	LGS	The LGSf shall detect and report system anomalies [Ref 3, Sec 3.7.5.2.5].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.20	LGS	The LGS shall interface with couriers to receive wideband data from selected LGN sites [Ref 3, Sec 3.7.5.1.12].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.21	LGS	The LGS shall be capable of playing wideband data received from selected LGN sites into the LPS [Ref 3, Sec 3.7.5.2.8].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2700.22	LGS	The LGS shall communicate with the MOC using the accepted Landsat 7 IPDU header, as specified in the Landsat 7 to Mission to Planet Earth Station ICD, for all Landsat 7 command and narrowband data.				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2710.01	LGS	LGS shall provide support for collection of coherent and non-coherent S-band tracking data as specified in Table 2710-1 and forward this data to the MOC [Ref 3, Sec 3.7.5.1.11].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.02	LGS	The LGSf shall receive 150 Mbps on any single X-band downlink frequency [Ref 3, Sec 3.7.5.3.1].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
2720.03	LGS	The LGSf shall receive any two of the three (8082.5, 8212.5, and 8342.5 MHz) X-band frequencies simultaneously [Ref 3, Sec 3.7.5.3.2].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.05	LGS	The LGSf shall be capable of tracking and meeting performance requirements at elevations of 5 degrees or greater. [Ref 3, 3.7.1.3.7.1]				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.05.01	LGS	The LGSf shall be capable of pointing to a 0-degree elevation.				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.06	LGS	The LGSf shall demodulate and bit synchronize the raw wideband data stream [Ref 3, Sec 3.7.5.2.3]				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.07	LGS	The LGS shall demodulate and bit synchronize the raw S-band data stream [Ref 3, Sec 3.7.5.2.7].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.08	LGS	LGS shall be capable of capturing the S-band data while simultaneously forwarding it to the MOC in real-time [Ref 3, 3.7.5.1.7].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.09	LGS	LGS shall be capable of providing X-band and S-band services simultaneously [Ref 3, Sec 3.7.5.2.1].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2720.10	LGS	LGS shall time tag received narrowband data within 1 ms of the receive time [Ref 3, Sec 3.7.5.1.10].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2730.02	LGS	LGS shall provide interfaces to the accepted data transport protocol channel to receive commands.				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
2730.03	LGS	LGS shall provide command block echo capability.				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
2730.04	LGS	LGS shall receive commands and command data loads from the MOC and transmit them to the spacecraft, as received, in real-time [Ref 3, Sec 3.7.5.1.8, and 3.7.5.1.9].				I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	
6200.01	LPS	The LPSf shall provide CCSDS AOS Grade 3 services to handle receipt of wideband data from the LGS [Ref 3, Sec 3.7.6.1.1, 3.7.6.2.1].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.01.01	LPS	The LPSf shall be capable of receiving the equivalent of 250 ETM+ scenes of wideband data per day from the LGS. This data will consist of a combination of data from local satellite passes and data received from other selected LGN sites.	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.01.03	LPS	The LPSf shall provide statistics and quality data to the MOC as documented in the LPS-MOC MOU [Ref 3, Sec 3.7.6.1.5]	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.02	LPS	The LPSf shall process all wideband data received to level zero R, within 16 hours after receipt of the last data in a return link session, on a subinterval basis [Ref 3, Sec 3.7.6.2.2, 3.7.6.3.2].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.02.03	LPS	The LPSf shall retain the raw wideband data for a minimum of 30 days from time of receipt [Ref 3, Sec 3.7.6.3.7].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.02.04	LPS	The LPSf shall perform Bose-Chaudhuri-Hocquenghem (BCH) error detection and correction decoding [Ref 3, Sec 3.7.6.2.4].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
6200.02.05	LPS	The LPSf shall provide the capability to schedule, replay, and reprocess up to 10 percent of a day's raw wideband data on a daily basis [Ref 3, Sec 3.7.6.3.8].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.03	LPS	The LPSf shall provide level zero R data to the EDC DAAC [Ref 3, Sec 3.7.6.1.2].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.04	LPS	The LPSf shall generate browse data on a scene basis [Ref 3, Sec 3.7.6.2.5].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.a	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 1. Geographic Area Coverage	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.b	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 2. Sensor	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.c	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 3. Date of Image Collection	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
6200.05.d	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following; 4. Time profile of image collection	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.e	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 5. Sun Elevation Angle	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.f	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following; 6. Summarization of non–nominal data	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.g	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 7. Calibration Events	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.h	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3];	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
		8. Image processing quality								
6200.05.l	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 9. Cloud Cover Summary	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.j	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 10. Subsampled Data	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.k	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following [Ref 3, Sec 3.2.1.3.1.5, 3.7.6.1.3, 3.7.6.1.4, 3.7.6.2.6.3]; 11. Sensor Gain Mode	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.05.l	LPS	The LPSf shall provide metadata and browse data to the EDC DAAC with each level 0R archive entry to include information to describe, at a minimum, the following; 12. Last on/Last off	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
		instrument times								
6200.06	LPS	The LPSf shall generate metadata on a subinterval basis with the metadata containing scene information [Ref 3, Sec 3.7.6.2.6].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.06.01	LPS	The LPSf shall identify scene boundaries (WRS reference on corner coordinates) for each scene within the associated metadata for each subinterval of level zero R data [Ref 3, Sec 3.7.6.2.6.1].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.06.02	LPS	The LPSf shall perform cloud cover assessment [Ref 3, Sec 3.7.6.2.6.2].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.06.03	LPS	The LPSf shall provide return-link quality and accounting information for all wideband data as part of the metadata [Ref 3, Sec 3.7.6.2.8].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.08	LPS	The LPSf shall coordinate with the EDC DAAC regarding the availability of level zero R data, metadata, and browse data, and the successful transfer of the data [Ref 3, Sec 3.7.6.1.6, 3.7.6.2.9].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.09	LPS	The LPSf shall receive reprocessing requests and processing parameters from the IASf, as specified in the LPS-IAS ICD [Ref 3, Sec 3.7.6.1.8].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.10	LPS	The LPSf shall receive schedule coordination information from the			I&T 6		I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
		LGSf [Ref 3, Sec 3.7.6.1.7].								
6200.11	LPS	The LPSf shall provide the capability to store LPS data files until confirmation of successful transfer is received from the EDC DAAC [Ref 3, Sec 3.7.6.3.3].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.13	LPS	The LPSf shall introduce no more than one bit error in 10**9 bits processed [Ref 3, Sec 3.7.6.3.5].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.14	LPS	The LPSf shall be capable of recording 14 minutes of wideband data per return link per session. [Ref 3, Sec 3.7.6.3.6].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.25	LPS	The LPSf shall produce indicators of system performance and data quality. [Ref 3, Sec 3.7.6.4.3]	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.25.01	LPS	The LPSf shall collect performance and quality data and deliver it with the metadata. [Ref 3, Sec 3.7.6.4.3.1]	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6200.25.02	LPS	The LPSf shall provide for display of indicators of system performance and data quality and make them available to the system operators [Ref 3, Sec 3.7.6.4.3.2]	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.02.01	IAS	The IASf shall receive level zero R products and associated metadata from the EDC DAAC [Ref 5, Sec 3.7.7.1.1.1].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.02.02	IAS	The IASf shall process level zero R data to produce radiometrically corrected level 1R, and radiometrically and geometrically corrected Level 1G images [Ref 3,	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
		Sec 3.7.7.2.3.1-2].								
6400.02.03	IAS	The IASf shall generate the equivalent of up to ten ETM+ Level 1G systematically corrected scenes per day [Ref 3, Sec 3.7.7.3.1].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.02.05	IAS	The IASf shall remove image artifacts as required while processing level zero R data to produce Level 1R images [Ref 3, Sec 3.7.7.2.3.5].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.02.07	IAS	The IASf shall receive definitive ephemeris files as described in the MOC to IAS ICD.			I&T 6		I&T 9.a	I&T 9.b	I&T 9.c	
6400.02.08	IAS	The IASf shall be capable of assessing on a sample basis the quality of ETM+ Level 0R products archived by the LPDAAC [Ref 3, Sec 3.7.7.2.4.7].	I&T 4.b	I&T 4.c	I&T 6		I&T 9.a	I&T 9.b	I&T 9.c	
6400.03	IAS	The IASf shall perform radiometric and geometric calibrations on selected Landsat 7 data [Ref 3, Sec 3.7.7.3].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.04.04	IAS	The IASf shall monitor and perform long-term trend analyses of system performance and image quality [Ref 3, Sec 3.7.7.1, 3.7.7.2, 3.7.7.2.4.5].	I&T 4.b	I&T 4.c	I&T 6		I&T 9.a	I&T 9.b	I&T 9.c	
6400.04.05	IAS	The IAS shall periodically compute sensor/satellite alignment, scan mirror profiles, and payload field angle knowledge and provide to the EDC DAAC [Ref 3, Sec 3.7.7.4.5, 3.7.7.3.5].	I&T 4.b	I&T 4.c	I&T 6		I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
6400.05.01	IAS	The IASf shall send a calibration parameters file to the EDC DAAC [Ref 3, Sec 3.7.7.1.1.2, 3.7.7.4.4].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.05.02	IAS	The IASf shall provide reprocessing requests and processing parameters to the LPSf, as specified in the LPS-IAS ICD [Ref DMR, Sec 6200.09 and Ref 3, Sec 3.7.7.1.2.1].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.05.03	IAS	The IASf shall receive necessary satellite and instrument performance data from the MOCf, and coordinate with the MOCf for the acquisition of ETM+ image data required for image quality assessment [Ref 3, Sec 3.7.7.1.3.2, Sec 3.7.7.1.3.3].	I&T 4.b	I&T 4.c	I&T 6		I&T 9.a	I&T 9.b	I&T 9.c	
6400.05.04	IAS	The IASf shall send problem reports, calibration parameters file, ETM+ image requests for calibration, and requests for concentrated definitive ephemeris to the MOCf [Ref 3, Sec 3.7.7.1.3.1, 3.7.7.1.3.4].	I&T 4.b	I&T 4.c	I&T 6		I&T 9.a	I&T 9.b	I&T 9.c	
6400.05.06	IAS	The IASf shall maintain an archive of its product calibration data and correction parameters [Ref 3, Sec 3.7.7.2.6, 3.7.7.3.4].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.05.07	IAS	The IASf shall produce data quality and system performance assessment reports [Ref 3, Sec 3.7.7.2.7].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	
6400.06	IAS	The IAS shall receive disposition of reprocessing requests from the LPS.	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	

DMR #	ELEMENT	DMR TEXT	I&T 4.b	I&T 4.c	I&T 6	I&T 7.g	I&T 9.a	I&T 9.b	I&T 9.c	COMMENTS
		test start dates	10/15/97	12/1/97	10/6/97	11/20/97	10/27/97	1/6/98	3/10/98	
6400.07	IAS	The IAS shall send problem reports and summary reports to the MMO [Ref 3, Sec 3.7.7.1.4.1].	I&T 4.b	I&T 4.c			I&T 9.a	I&T 9.b	I&T 9.c	

Appendix B
Mission Readiness Test Descriptions

I&T 4.b and I&T 4.c -- Mission Science Data Processing. The objective of these tests are to verify:

a. The integrated ability of the Landsat 7 Ground System to process, archive and distribute Landsat 7 ETM+ payload wideband data in accordance to the test requirements identified in I & T # 4 of the Requirements Versus Test Matrix (Section 7) of the Landsat 7 Ground System Integration and Test Plan.

b. The ability of the LGS to provide ETM+ Wideband data to the LPS.

c. The LPS capability to receive/archive Wideband data and generate Level 0R data, Browse data, and Metadata for transmission to the EDC DAAC.

d. The EDC DAAC capability to receive and archive LPS provided Level 0R, Metadata and Browse data and provide retrieve capability of these data by the IAS.

e. The IAS ability to send calibration and data quality data to the LPS, MOC and EDC DAAC.

f. The IAS ability to produce radiometrically and geometrically corrected Level 1R/1G images from Level 0R data.

g. The MOC ability to send the IAS instrument performance data.

Refer to Section 6 of the Landsat 7 Ground System Integration and Test Plan for further test details.

I&T 6 -- Mission Planning/Scheduling Test. The objective of this test is to verify:

a. The integrated ability of the Landsat 7 Ground System to support and maintain mission scheduling functions including long-term planning, short-term planning, and daily scheduling for narrowband and wideband support services in accordance to the test requirements identified in I & T # 6 of the Requirements Versus Test Matrix (Section 7) of the Landsat 7 Ground System Integration and Test Plan.

b. The MOC ability to interface with the NCC for AGS, SGS, and WOTS narrowband support schedules.

c. The MOC capability to interface with the WOTIS for narrowband support schedules.

d. The FDF ability to provide the MOC planning data/aids.

e. The MOC ability to interface with the LGS and IGSs (via MMO) for wideband ETM+ Direct Downlink and Special requests.

f. The IAS ability to send Full and Partial Aperture Calibration requests to the MOC and receive MOC provided schedules.

g. The MOC capability to request Metadata and receive Metadata from the EDC DAAC.

h. The MOC ability to receive Cloud Cover Predicts provided by the National Center for Environmental Predictions (NCEP).

i. The MOC capability to generate a nominal 48-hour schedule of activities including ETM+ imaging, SSR activities, and narrowband/wideband services.

Refer to Section 6 of the Landsat 7 Ground System Integration and Test Plan for further test details.

I&T 7.g TT&C -- Landsat Ground Station (LGS) Data Flow. The objective of this test is to verify:

a. The integrated ability of the Landsat 7 Ground System to schedule, receive, record, process and forward telemetry, tracking, and command data from the S-band and X-band tracking sites in accordance to the test requirements identified in I & T # 7 of the Requirements Versus Test Matrix located in Section 7 of the Landsat 7 Ground System Integration and Test Plan.

b. The ability of the SN, LGS, AGS, SGS, and WOTS support stations to provide 2287.5 Mhz S-band downlink for telemetry data and 2106.4 Mhz S-band uplink for command data.

c. The LGS, AGS, SGS and IGSs capability to support X -band downlink frequencies of 8082.5, 8212.5, and 8342.5 Mhz for wideband payload data.

d. The SN capability to uplink 125 and 1 00 bps commands received from the MOC.

e. The LGS, AGS, SGS, and WOTS capability to uplink 2 kbps commands received from the MOC.

f. The SN ability to provide 1.216 and 4.864 kbps real-time telemetry data to the MOC.

g. The LGS, AGS, SGS, and WOTS capability to provide 1.216 and 4.864 kbps real-time telemetry data and 256 kbps playback telemetry to the MOC.

h. The FDF ability to receive and process 2-way doppler tracking data from the LGS, SN, AGS, SGS, and WOTS.

i. The MOC capability to transmit 125 b ps and 1000 bps command data to the SN and 2 kbps command data to the LGS, AGS, SGS, and WOTS.

j. The MOC capability to receive, process, and store all narrowband telemetry rates.

k. The Nascom ability to provide voice and data circuits between all elements.

Refer to Section 6 of the Landsat 7 Ground System Integration and Test Plan for further test details.

I&T 9.a, 9.b, and 9.c – TT&C - Fully Integrated Ground System Test. The objective of these tests is to verify:

a. The integrated ability of the Landsat 7 GS to provide command and telemetry spacecraft control operations, tracking data processing and planning/support accordance to the test requirements identified in I&T # 9 of the Requirements Versus Test Matrix located in Section 7 of the Landsat 7 Ground System Integration and Test Plan.

b. The ability of the MOC to receive, process, and store all Landsat 7 telemetry rates in all telemetry formats and station modes of operation.

c. The LPS capability to receive, process and archive Wideband payload data to level 0R and provide Level 0R, Metadata and Browse data to the EDC DAAC and IAS.

d. The IAS capability to receive Level 0R data from the LPS and process to Level 1R/1G parameters.

e. The FDF capability to provide the MOC with planning aids, attitude determination and ephemeris data for MOC command load generation.

f. The MOC capability to generate all command load types necessary for the management of the SSR, SCPs, and FSW, and transmit commands in all applicable rates/modes to all supporting commanding stations.

g. The MOC capability to extract memory dump data from the telemetry stream and assemble a complete memory image for comparison on the ground.

h. The ground systems ability to exchange data quality statistics between elements.

i. The FDF capability to receive ETM+ alignment information from the IAS and provide IAS with definitive ephemeris.

j. The EDC DAAC capability to receive, store, and provide user access of Metadata and Level 0R product components.

k. The MOC ability to receive scheduling inputs from the MMO and incorporate these plans/requests in the MOC scheduling database for schedule prioritization.

l. The MOC capability to produce a conflict free schedule for ETM+ and SSR management, and uplink/downlink S-band and X-band services.

m. The FSME ability to build flight software loads and provide checksum load values.

n. The FSME ability to validate all flight software command loads prior to uplink.

o. The Nascom ability to provide voice and data circuits between all elements.

Refer to Section 6 of the Landsat 7 Ground System Integration and Test Plan for further test details.